December 5, 1997

To: MP-400, Will Keck and Lee Laurence
From: MP-200, Jim Goodwin
Subject: Review of Draft Prospect Island Project Modification Report, US Army Corps of Engineers, Sacramento District, October 1997
(Your email request dated 11-7-97)

We have briefly reviewed the main report and appendices for technical adequacy, for accuracy of existing conditons, and for accuracy of interpretations made relating to the potential for flooding on Prospect Island as a cause for the high groundwater conditions on portions of Ryer Island. Comments significant to the Ryer Island issue are presented first and are followed by additional technical comments.

1. Pages 48 through 51 discuss Potential Adverse Effects of the project. One brief paragraph (P.50) states that the seepage on Ryer Island issue can be resolved by conducting a limited exploration program, and developing a seepage model and analysis. We disagree. In preliminary discussions in September 1997 USBR did, however, concur with this approach. Now we believe that data from a limited program would not necessarily support a definite conclusion either way about significant hydraulic connectivity between the islands. Any geologic information obtained would be interesting and would help characterize subsurface conditions but would apply only to the immediately surrounding area and would not necessarily be representative. This is primarily due to the potential for subsurface seepage conditions to change over very short horizontal and vertical intervals. It may not be possible to gain a complete enough understanding about hydraulic connectivity between the islands. USBR technical staff still maintains that any possible hydraulic connection between the islands is NOT the cause of the seepage on Ryer Island. The Miner Slough channel is so deep that it intercepts any common zones of high permeability that may be a source of seepage onto Ryer Island.

Page 56 "Further Studies" contains a similar statement recommending additional explorations to which we disagree.

2. Appendix J (which is mistitled) presents information and evaluates trends on available observation well readings taken since April 1996. This appendix is titled as a "Seepage Analysis." It is NOT an analysis. It is only a brief presentation of available instrumentation data with minimal interpretation. We concur with the observed trends. We also believe this type of information may be the best evidence that seepage conditions experienced by Ryer Island are influenced by Miner Slough water levels, and not by Prospect Island water levels. We recommend that this data collection and analysis effort be continued.

The last paragraph states that no definite conclusion can be reached with available data. It does not make recommendations on how to continue with "seepage analysis" even though Appendix J is the "analysis" section. The recommendation for additional drilling and analysis is in a one liner on page 56. This issue of potential seepage between islands and what actions are required to resolve the issue needs to be outlined more carefully.

3. Page 16 "Flooding" needs to be updated to reflect completion of the breach repair on Nov 25. To be complete, this section should mention also that there is substantial damage to both island side and Miner Slough side levee sideslopes. Some of these were repaired but others weren't. There will be additional costs to bring them up to an acceptable condition for long-term service. The cross levee may only have a 700 ft breach but both north and south sideslopes are severely damaged and will require expensive repairs to re-establish the embankment for long-term service.

4. Since the breach was formed in January 1997 there has been at least one drowning fatality as a boater was recreating near the breach area. I recall the Solano County sheriff's deputy reporting to the USBR construction inspector of perhaps other accidents or near misses. Any planned breach particulary on the Miner Slough side will be a boating hazard to the general public not just commercial shipping in the deep water channel.

5. Page 33 and other locations. The discussion of O&M costs and responsibilities may not be complete. Time did not permit a thorough review. You should confirm these costs and whether USBR will remain as owner of the property or responsible for any future maintenance costs.

The powerlines may not need to be relocated. They will be used to unwater the island during refuge construction but not in the long term. The pump station will likely eventually be removed.

6. Page 55 "Flooding." Update status of repairs to USBR and Port breaches and levees.

Following are comments by Chris Reeves and Steve Sherer, the staff members of MP-220 who reviewed the subject document. The focus of their reviews were issues related to the geology and groundwater of Prospect Island and the surrounding areas.

General Comment: The reviewers' major concern is the dearth of geotechnical data to support the statements and conclusions relating to the anticipated impacts when Prospect Island is converted to a wildlife area. Of particular concern are the report's statements as to the long-term effects of ponding at the site and the potential for seepage to adjacent properties. Review of the report provides only limited discussion of site geology and groundwater conditions. It is suggested that the final report include a more detailed discussion of geology and groundwater and provide all available exploration and field data to support the various statements and conclusions presented in the report. Specific comments are listed below:

CHAPTER II - EXISTING CONDITIONS

Page 13, Paragraph 2, Sentence 2 - Suggest replacing the phrase "upward at the northern portion of the site" with "upward at the northern and northeastern portions of the site".

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Page 13, Paragraph 2 - The writer might describe the drainage channels within the island. The description could include channel depths and the designed directions of flow.

Page 13, Paragraph 3 - This a poorly written paragraph. The writer probably could expand this discussion of "geologic history" into more than one paragraph. We suggest a rewrite.

Page 13, Paragraph 4, Sentence 1 - What is meant by the term "mineral" in the phrase "mineral alluvial fan deposits"? A detailed geologic description of soil types is needed with: data on soil thicknesses, areal extent and continuity, how these soils relate to the passage of surface water into the groundwater system and/or how the soils serve as barriers and/or facilitate vertical and horizontal movement of groundwater in the area.

Page 13, Paragraph 5 - This a poorly written paragraph. It includes soils, ground water, permeability, the dredged spoil area, etc. There are too many subjects included for just one paragraph. We suggest a rewrite expanding on the each of the "subjects".

General comment: The statements and conclusions presented in this section are open to several different interpretations. This is due to the lack of supporting data and conflicting statements presented in the referenced appendices.

The permeability rates (K) and soil distribution information presented in this report lacks supporting detailed geologic data. It is suggested that this report include a drawing showing the locations of all geologic explorations performed on Ryer Island, Prospect Island, Miner Slough and the ship channel. In addition, the report include all geologic logs of all explorations, pump out test data, piezometer water levels, and surface water level data for Miner slough.

If water level observation data are of short duration and poor correlations exist between surface water levels in the slough and ground water beneath the islands due to flooding, rainfall, levee seepage, etc... the report should so state. The seepage data for Ryer Island levees requires documentation. Staff of the USBR have observed seepage along levee toes during high water levels in Miner Slough. This seepage collects in surface ponds on Ryer Island, where the owners are claiming impacts from high groundwater levels.

Page 13, Paragraph 5, Sentence 2 - "The ground-water table varies between 1 and 4 feet in depth..." Is this variation due to seasonal changes, tides, or what? Is the variation from one location to another? What is the groundwater gradient below Prospect Island? What locations below the island reflect the shallowest groundwater levels? The deepest? What impact does island flooding have on shallow groundwater? What is/are the primary sources of recharge to groundwater below Prospect Island? We strongly suggest that the author discuss groundwater.

Page 13, Paragraph 5, Last Sentence - The sentence "There is very little peat soil in the project area (appendix A)" strongly conflicts with discussion and tables in Appendix A. Appendix A on Page 1, Paragraph 3, Sentence 1 states "Surficial organic soil to include peat (OH-OL-Pt) vary in

thickness from 2 feet at the north end of the Island to 21 feet at the south end." The table on Page 2 of Appendix A shows approximate depths to range from 2 to 20 feet. The dredge spoil area was shown to contain approximately 33 per cent organic soils including peat. Appendix A suggests that significant peat soils are in the project area.

Page 48, POTENTIAL ADVERSE EFFECTS - The alternatives should address impacts to shallow groundwater including groundwater quality.

APPENDIX A - GEOTECHNICAL REPORT - Appendix A, although labeled "Geotechnical Report", does not include a detailed geotechnical report. Instead, it includes a report titled "Reconnaissance Report, Proposed Wetlands, Prospect Island" dated May 31, 1994. It is recommended that the author present an evaluation of the soils and geologic data.

Page 1, Paragraphs 3 and 4 - It appears that the author presented both engineering (Paragraph 3) and agricultural (Paragraph 4) soils descriptions. What is the relationship between the two descriptions? It is suggested that a map depicting the soils described in Paragraph 3 be included in the report. Also needed is a map showing the locations of all geologic explorations and inclusion of the geologic logs.

Page 1, Paragraph 3 - The soil types described in this paragraph do not coincide with the soil types presented in the table on page 2.

Permeability rates stated elsewhere in the report are not correct if the soils type present are clay, as shown in summary data on Page 2.

Page 1, Paragraph 4 - A sentence is included in this paragraph which briefly describes groundwater and coefficient of permeability (K). We suggest that the author treat these two technical subjects as topics, rather than insert them in the middle of a section titled "Agricultural Soil Types".

Page 1, Paragraph 5 - A significant amount of geologic exploration is reported in this paragraph. A map showing locations of some of the explorations is attached as Fig 1. However, there is no geologic discussion regarding the exploration in Appendix A. We strongly suggest that Appendix A, titled Geotechnical Report, include a discussion of geology of the Prospect Island area.

Page 2, Tables of summary data on soils - more data is needed to adequately evaluate soil continuity, distribution and their interactions with surface and groundwater movements.

Photographs - Several photographs are attached at the end of Appendix A. There is no discussion of the photos in the Appendix. What is the correlation between Appendix A and the photographs?

Also, the Photograph 2 caption states "View of high ground water table at the north end of the Island. i.e. depth to water 2-3 feet." Obviously, a groundwater table at a depth of 2-3 feet can not be shown in a photograph taken at the surface.

Appendix C, Environmental Assessment/Initial Study

Page 9, Paragraph 3.2 Geology/Geography - This paragraph is inadequate. It is suggested that the author prepare an expanded geology section.

Page 28, Paragraph 4 - Please see the previous comments regarding soils, geology, soil permeability, and groundwater.

Page 29, Section 4.5.2 Effects - It is suggested that this section include a discussion of impacts the proposed channel cuts will have on the groundwater. If, as reported, sand intervals underlie the surface clays, then there could be increased contribution to the groundwater system from water flowing in the proposed channels.